

Appn. Number 10/653,678 Michael John Keogh Nguyen/2831 Amnt. A

REMARKS- General

Drawing objections are noted and are corrected with new drawings submitted herewith.

Applicant has rewritten claims to define the invention more particularly and distinctly so as to overcome the technical objections and define the invention's patentability over the prior art.

Claims Objection

As required by the O.A., claim 3, now rewritten as claim 20, has been changed to be dependent on rewritten claim 19.

Rejection of Claims 1 and 8 Under 35 U.S.C. 102(b)

The O.A. rejected claims 1 and 8 as being anticipated by Merry (4,513,173). Claims 1 and 8 were rewritten as new claims 18 and 25 to define patentability over this reference. Applicant requests reconsideration of this rejection, now applicable to claims 18 and 25, for the following reasons:

(1) The physical form of the Merry intumescent sheath is a rectangular-shaped intumescent material (**inorganic**) arranged around a conduit. Applicant's intumescent material consists of an extruded organopolymer-based coating containing generally organophosphorous moieties as intumescent.

(2) The Merry intumescent sheet is used repeatedly to form his multiple layer construction. Applicant's invention contains two distinctly different layers acting synergistically to produced the novel and unexpected results discussed.

(3) Merry adds complexity to his construction with the necessary addition of a restraining layer around cable or conduit.

(4) Moreover, this restraining layer must be held in place with a high temperature resistant material as an overwrap.

(5) Merry intumescent is **inorganic** and fashioned so as to allow expansion only in an inward direction. Applicant's intumescent system is **organic** and unrestricted for expansion, preferentially outward.

(6) The shape of the Merry construction is described as fin or alternatively rectangular before exposure to heat. Applicant's form, following extrusion application, will be circular in nature.

Based on the above points, applicant believes his new claim 18 contains novel matter over Merry and is patentable.

Further, the O.A. states that Merry discloses a dual layer non-halogen protective sheath comprising an outer intumescent polymer layer and an inner polymer layer as

means for providing second level of fire protection. Applicant does not see any evidence in

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Merry to support this statement. Merry states clearly that, unlike applicant's, his intumescent material is, "**substantially inorganic**". Nowhere does he state that any layer is a polymer layer. His only discussion mentioning organic materials is contained in column 1, lines 14-34. Therein he cites the numerous disadvantages of the polymer systems employed. This prior art discussion by Merry would lead away from applicant's novel organopolymer-based dual layer approach.

For the reasons above the rejection of claims 1 and 8, now rewritten as claims 18 and 25, is overcome. Merry's multilayers surrounding the insulated core bears no similarity to applicant's novel polymer-based dual layer construction. Moreover, Merry's suggestion to use his construction in plenum application can not be taken as anticipating applicant's novel and synergistic construction for use in the same application.

Rejection of Claims 1-7 and 9-17 Under 35 U.S.C 103 (a)

The Rejection of Claim 1 on Keough and Belli is Overcome

The O.A. rejected independent claim 1 on Keough and Belli. Claim 1 has been rewritten as new claim 18 to define patentability over these references, and any combination thereof. Applicant requests reconsideration of this rejection, as now applicable to claim 18, for the following reasons:

(1) There is no justification, in Keough and Belli, or in any other prior art separate from applicant's disclosure, which suggests that these references be combined **in the manner proposed**.

(2) Belli's method of combining would not show all of the novel features of claim 18.

(3) The novel features of claim 18 produce new and unexpected results and hence are unobvious and patentable over these references.

The References and Differences of the Present Invention Thereover

Prior to specifically discussing the claims and the three points made above, applicant will first discuss the references and the general novelty of the present invention and its unobviousness over the cited references.

Keough et al. Nowhere does Keough et al. suggest the need for a dual layer construction. Keough discloses a single layer jacketing composition wherein flame resistance is enhanced over the prior art with the introduction of a mixture of zinc oxide and red phosphorous. In so doing Keough claims to have optimized the fire resistance of the jacket in UL1065 fire testing (col.8, Table II, ex. 3,5,6,7). Keough concludes they have solved the problem of fire and flame spread control and gives no indication of any concern for performance under more severe testing conditions.

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Keough, unlike applicant, does not recognize the direct correlation of an increase in cable temperature with an increase in flame spread on said cable. This key feature, discussed by applicant in his specification (p. 2) was not found in Keough's UL 1685 testing. The UL 1685 fire test method is not severe enough because of the limited time/ temperature exposure of the cable. In UL 1685 fire testing is performed in an **open area** with a 70,000 BTU flame source over 10 minutes. Applicant makes the point (p.2) that testing under severe conditions, such as for plenum application(UL 910), shows limitations for Keough type systems. UL 910 testing conditions are a 300,000 BTU flame source for 20 minutes in a 25 foot **insulated tunnel**. Under these severe conditions cable heat buildup downstream of the flame front is substantial and all metal hydrate FR systems are severely compromised.

In summary, Keough et al., make no suggestion, and in fact believing they have solved the flame spread problem with the combination of ZnO/P(red) added, leads away from any consideration of a second fire protection layer. Keough et al. do not see thermal protection for a metal hydrate system as means to greatly enhance fire performance against flame spread.

Belli et al. Applicant's new claim 18 is substantially different from Belli's teachings in several important respects.

Firstly, applicant's **solid, non-foamed polymer layer** capable of intumescenting to provide a thermal insulating barrier is substantially different and distinguished from Belli's **pre-foamed coating** containing an intumescent material that is added to provide a char. Belli takes this pre-foamed approach because, as he states, his objective is to displace armour plating used in cable. In taking the pre-foamed approach Belli has added a process step and increased the cost and complexity to manufacture. Applicant in his specification (p's 2-3) discussed the numerous disadvantages and complications of a pre-foamed system.

Secondly, the O.A.'s suggestion that Belli discloses a outer intumescent polymer is misleading. In his Fig. 3 Belli is disclosing a single layer employed over an insulated conductor core. As such, it is neither an inner nor an outer layer. In fact when Belli does suggest adding an additional layer he employs this addition as the **outer layer** over the construction shown in Fig. 3. Never in the reference is there any suggestion to use Belli's pre-foamed coating as an outer layer in a dual layer construction. He does not see nor anticipate the novel synergistic properties of applicant's construction.

Thirdly, Belli shows no recognition for the corrosive nature of the phosphorous components of his composition. Lacking this awareness he takes no steps to defeat this important deficiency. Applicant is very specific in the design of his cable constructions (claims 18 and

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26). Applicant constructions are designed to take full advantage of the synergism necessary to control flame spread and conductor corrosion.

Keough And Belli Do Not Contain Any Justification To Be Combined In The Manner Proposed

Point 1(above)-As stated in the O.A. Keough does not disclose an outer intumescent polymer layer as means for providing thermal, fire, physical and mechanical protection. Clearly the reason for this failure is that Keough does not recognize the deficiency of a metal hydrate based flame retardant system under severe time/ temperature exposure conditions. He does not possess the awareness that as a cable's temperature is elevated by the exposure to the extremes of high temperature over a prolonged period of time that the effectiveness of any metal hydrate FR system is severely compromised. Under the conditions experienced in, for example, the plenum UL 910 test, the non-thermally insulated hydrate systems provide little protection against flame spread. Once cable ignites flame spread is unimpeded and failure always occurs.

Point 2 (above)- Belli discussed in his specification enhancing the flame retardance of his single pre-foamed protective layer.(In claim 2 he adds a polymer sheath over his pre-foamed coating but does not indicate that it is flame resistant). As in the case with Keough, Belli has no awareness of the serious limitations for any metal hydrate system relative to flame spread. He specifically adds the sheath over his pre-foamed coating. Never in the reference is there any recognition of the synergism that is provided by applicant's construction. Belli is protecting his intumescent FR system; while applicant is using the intumescent layer to thermally insulate and preserve the efficacy of the metal hydrate FR system, inner layer, against flame spread.

Point 3 (above)Another key factor, behind applicant's construction but absent from the references, is the application of the inner layer to mitigate against the corrosive potential of the phosphorous materials in the outer layer. Belli, totally unaware of this potential, always places his phosphorous containing layer nearest the conductor. There is nothing to support the O.A.'s proposed combination. The combination used in the Belli reference does not provide the novel and important features that applicant has revealed. Only applicant's novel and unobvious non-foamed dual layer cable constructions, as detailed in claims 18 and 26, will provide maximum protection against flame spread and conductor corrosion.

The Rejection of Claim 9 on Keough And Belli Is Similarly Overcome

The O.A. rejected claim 9 on Keough and Belli. Claim 9 has been rewritten as new claim 26 to define patentability over these references. The above arguments advanced to establish novelty and patentability for applicant's application over Keough and Belli and including the

suggested possible combination, hold for new claim 26.

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Moreover, claim 26 discloses another novel use for the dual layer cable construction. Herein the dual layer concept is applied so that the first layer performs the function of a **conductor insulant** while the second, outer layer, provides the thermal, fire, physical and mechanical protection. In a new use, not captured by any previous artisan, the inner insulating layer is formulated to contain sufficient acid neutralizer to protect the conductor from the corrosion that would result from the acids produced by ambient hydrolysis of the phosphorous-based intumescent material. As stated, this use was not previously recognized, so neither it nor its concomitant advantages were known or appreciated.

The Rejection of Claims 16 and 17 Is Overcome

The O.A. rejected claims 16 and 17, now rewritten as new claims 33 and 34, citing a modified sheath of Keough as obvious to one skilled in the art. Applicant has argued the patentability of his claim 9, now rewritten as claim 26, over the modified construction of Keough. Moreover, applicant states that his novel dual layer construction finds a new use in protecting against conductor corrosion. This new use solves a problem that had previously escaped solution and had restricted the use of organophosphorous based intumescent materials for application in building and automotive wire constructions. Finally, whereas dual layer constructions find application in building wire the outer layer has not been flame retardant nor thermal insulating. Dual layer building wire constructions use a polyamide, nylon, outer layer providing for physical and mechanical protection to the underlying insulation coating. The nylon layer is more flammable than the PVC insulating layer and it does not provide for any thermal insulation. Applicant's construction provides for both fire and thermal insulation of the insulating layer as well as mitigating against conductor corrosion.

The Dependent Claims Are A Fortiori Patentable Over Keough And Belli

New dependent claims 19-25 and 27-34 incorporate all the subject matter of claim 18 and 26 and add additional subject matter which makes them a fortiori and independently patentable over these references.

Claim 18, as written, additionally cites the dual layers to be polymer-based and the physical state for the individual layers as being solid, non-foamed.

Claims 19-24 add new matter combined with claim 18 and are patentable over Keough et al. and Belli et al.

Claim 25 adds new matter combined with claim 18 and is patentable.

Claim 26 as written cites the dual layer construction for a new use as an insulation and a protective sheath. Moreover it cites the novel feature for providing conductor corrosion protection.

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Claims 27-32 add new matter combined with claim 26 and are patentable over Keough et al. and Belli et al.

Claims 33 and 34 as written cite specific end use wire applications for the construction detailed in claim 26. The novelty of the construction of claim 26 makes its use possible for the applications cited in claims 33 and 34.

Applicant has reviewed the non-applied reference, Barusseau et al. patent application US 2003/0178220A1. The reference neither shows his invention nor renders any part obvious.

Conclusion

For all of the reasons above, applicant submits the specification and claims are now in proper form and that the claims all define patentability over the prior art. Therefore he submits that this application is now in condition for allowance, which action is respectfully solicited.

Conditional Request for Constructive Assistance

Applicant has amended the claims of this application so that they are proper, definite, and define novel and unobvious matter. If, for any reason this application is not believed to be in full condition for allowance, applicant respectfully requests the constructive assistance and suggestions of the Examiner pursuant to M.P.E.P. 707.07(j) in order that the undersigned can place this application in allowable condition as soon as possible and without the need for further proceedings.

Very Respectfully,


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Date: August 2, 2004

Inventor's Signature

